

## **CHAPTER 6**

### **OPERATION OF TWGSS**

#### **LESSON PLAN 6**

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#### **METHOD:**

Conference, demonstration, and practical exercise

#### **TIME ALLOTTED:**

3.0 hours

#### **COURSE PRESENTED TO:**

- a. Tank crews
- b. Instructors
- c. TSC personnel

#### **TOOLS, EQUIPMENT, AND MATERIALS:**

See Appendix A

#### **PERSONNEL:**

- a. Primary instructor
- b. Assistant instructor

#### **INSTRUCTIONAL AIDS:**

- a. Overhead projector
- b. Viewgraphs (Appendix E)

#### **REFERENCES:**

- a. TM 9-6920-709-12&P-1-1, Chapter 2.
- b. TM 9-2350-255-10-1/2
- c. TM 9-2350-264-10-1/2
- d. FM 17-12-1-1, Chapter 16

#### **APPENDICES:**

Appendix A. Tools, Equipment, and Materials  
Appendix B. Safety  
Appendix C. TDRS Memory Card Setups  
Appendix D. Setup of Training Area  
Appendix E. Viewgraphs

## 6-1. INTRODUCTION.

(5 minutes)

Note. Show Slide 1.

- a. **Reason.** TWGSS is designed to provide tank crews with a training device to conduct precision gunnery training. To use TWGSS to its full potential, you must know how to operate TWGSS in the various training modes.

Note. Show Slide 2.

- b. **Training Objective.** Given an operational M1/M1A1 tank with TWGSS installed and aligned, the crew will conduct the following exercises:
  - (1) Panel gunnery
  - (2) Combat mode (force-on-force)
  - (3) Scaled gunnery
  - (4) Tracking training
- c. **Procedure.** During this block of instruction we will cover operation of TWGSS during training. The classroom portion of the class will cover important functions of TWGSS to consider during training. Each tank crew will have an assistant (small group) instructor for the practical exercise portion of this class.

## 6-2. CONFERENCE/DEMONSTRATION/PRACTICAL EXERCISE. (160 minutes)

Notes.

- 1. The primary instructor will release the student crews to their assigned assistant (small group) instructors for the practical exercise portion of this lesson.
- 2. Show Slide 3.

- a. **TWGSS Training Modes.** TWGSS provides several modes of training that can be used for various types of exercises. The following training modes can be selected:
  - (1) **Panel gunnery.** This mode of training is conducted with target panels equipped with retro reflector units and LTIDs.
  - (2) **Scaled gunnery.** Scaled gunnery can be conducted with 1/2 scale targets. This provides long range gunnery training in ranges and training areas that do not have the desired distances.
  - (3) **Combat mode (force-on-force).** This training mode can be done with other TWGSS/PGS/MILES-equipped tanks and retro reflector units.
  - (4) **Tracking training.** The system provides manipulation training with the use of tracking training mode.

Note. Show Slide 4.

## 6-2. CONFERENCE/DEMONSTRATION/PRACTICAL EXERCISE (Con't).

- b. **Transparency During Training.** TWGSS is designed to be fully integrated with the tank. The tank crew is required to perform the same procedures as required during live fire gunnery.

Note. Show Slide 5.

### (1) **Laser rangefinder (LRF) simulation.**

- (a) **LRF with TWGSS.** TWGSS provides the crew with two types of LRF simulation, which can be selected by the crew using the control panel.

1. TWGSS is used to determine range.
2. Filtered range finder of the tank is used to determine range.

The type of training exercise conducted determines which LRF method to select. The filtered tank LRF is primarily used for defensive engagements where the gun tube is masked. The TWGSS LRF is used for offensive engagements. It must be used for scaled gunnery training.

Note. Show Slide 6.

- (b) **TWGSS LRF template.** TWGSS has a template for the simulation of the rangefinder. The system gives a range depending on how the gunner aims the reticle on the target. The following template is used:

1. Actual range when reticle is on the target
2. Short range when gunner aims low on target
3. Long range when gunner aims high or beside the target

Note. Show Slide 7.

- (2) **Loader's function.** The loader must use the loader's panel to select the ammunition desired and to simulate the loading of a main gun round. For additional training, a dummy round can be loaded.

Note. Show Slide 8.

- c. **TBOS Effects.** Visual effect of firing the main gun and coax are simulated in the GAS and GPS day and thermal mode. The effects simulated are:

- (1) **Tracer simulation.** The tracer of the main gun round and every fifth coax round are simulated in GPS and GAS sights. The correct burn time of each ammunition type is pre-programmed.

## 6-2. CONFERENCE/DEMONSTRATION/PRACTICAL EXERCISE (Con't).

- (2) **Burst simulation.** Burst on target and ground burst are simulated. Ground burst effects are smaller than target hit burst effects. The burst size is ammunition and range dependent.
- (3) **Obscuration.** The obscuration of firing the main gun is simulated in GPS and GAS sights. The instructor can adjust the duration from 0-6 seconds.

Note. Show Slide 9.

- d. **Tracer Template.** The visual effects of the TBOS simulation are controlled by a template. The following happens with TBOS effects when firing in the different areas.

Note. The template is a T80 frontal for main gun and a kneeling soldier for coax.

- (1) **Area A.** If area A is hit, tracer simulation is stopped. A burst on target indication is given. Burst on target indication is bigger than burst on ground indication.
- (2) **Area B.** If area B is hit, tracer simulation is stopped prior to reaching target and burst on ground indication is given at the impact point between projectile and a simulated ground plane.
- (3) **Area C.** If area C is hit, tracer simulation continues until the simulated projectile reaches maximum simulated range (if this happens prior to a ground hit) or hits the simulated ground plane.
- (4) **Area D.** If area D is hit, tracer simulation stops at the top of the template or simulation continues (with the tracer simulation switched off) until the ammunition reaches maximum simulated range or hits the simulated ground plane.

Note. Show Slide 10.

- e. **Ammunition Simulation.** The ammunition of the main gun and coax are simulated to the following ranges:

- (1) Main gun ammunition is simulated to 3750 m.
- (2) 7.62mm coax ammunition is simulated to 900 m.

Note. Show Slide 11.

- f. **Result Presentation.** The TWGSS system has the following capabilities.

- (1) **Numerical presentation.** This is used during exercises where immediate feedback is needed or desired.
- (2) **Graphic presentation.** This is used for exercises where the presentation of the impact point in relation to the target outline is more important than numerical presentation.

## 6-2. CONFERENCE/DEMONSTRATION/PRACTICAL EXERCISE (Con't).

- (3) **Result presentation OFF.** When conducting gunnery training or combat mode (force-on-force) exercises where the crew should not see the results until after the exercise, the instructor can turn off the result presentation in the control panel. The results are still stored on the TDRS memory card for AAR.

g. **Results Provided by Control Panel.** The system provides both the results from engagements where a tank has fired or has been fired upon.

Note. Show Slide 12.

- (1) **Fire result.** Elevation and azimuth impact point on the target is shown in relation to center of mass. The results are provided in meters with a resolution of 0.1 m. The aspect angle, type of round fired, and effect on the tank are also provided on the display screen.

Note. Show Slide 13.

- (2) **Target result.** Elevation and azimuth impact point on the tank is shown in relation to the center of mass. The results are provided in meters with a resolution of 0.1 m. The aspect angle, type of round fired, and effect on the tank are also provided on the display screen.

Note. Show Slide 14.

h. **Engagement Result.** The control panel presents an evaluation of the engagement together with the actual hit coordinates and range to target. The following results are possible.

- (1) **HIT.** The simulated round hit the target. The simulator assumes the target is either a T80 Frontal for a main gun round or a kneeling soldier for coax rounds. If the control panel indicates a HIT, a MILES code is sent to allow the LTID to function.

Note. MILES codes used for TWGSS are IAW the enhanced MILES code structure.

- (2) **GROUND HIT.** A ground hit occurs if the ammunition falls short of the maximum range simulated for that ammunition type or falls short of the target. A ground hit is presented with the range of the actual ground impact.
- (3) **MAX RANGE.** If maximum range is indicated on the control panel, the round fired did not pass a target with a retro reflector unit within the field of view of the transceiver unit.

## 6-2. CONFERENCE/DEMONSTRATION/PRACTICAL EXERCISE (Con't).

- i. **Sound Indications.** The system uses sound to indicate to the crew that different events have taken place. The sound indications can be divided into firing system and target system sound indications.

Note. Show Slide 15.

- (1) **Firing system sound indications.** For the loading and firing of ammunition the following sound indications are heard through the tank intercom:
  - (a) The opening of the ammunition door. This occurs when the loader presses the loader's panel to load ammunition.
  - (b) The closing of the breech block. This indicates to the crew that the round is chambered and ready to be fired.
  - (c) The main gun firing and the AFTCAP falling from the breech. This indicates to the crew that a round has been fired.
  - (d) The firing of the COAX.

Note. Show Slide 16.

- (2) **Target system sound indications.** When a TWGSS system is fired, the tank intercom indicates to the crew the following:
  - (a) NEAR MISS = 2 tones. If the tank had a near miss, the tank intercom indicates with 2 tones.
  - (b) HIT (no kill) = 4-6 tones. If the tank is hit by a round but not killed, the tank intercom indicates with 4-6 tones.

Note. WEAPON KILL and MOBILITY KILL are also indicated with 4-6 tones.

- (c) KILL = continuous tone. If the tank is hit and killed, a continuous tone for 30 seconds is heard in the tank intercom. A kill tone is also indicated if CGUN KILL is transmitted to the tank.

Notes.

1. In combat mode, a killed tank is reactivated with the CGUN. The tank ammunition load is returned to the pre-programmed load.
2. If the tank is killed during panel gunnery, the target system autoactivates after 10 seconds and the kill indications stop. The tank ammunition load is returned to the pre-programmed load.

- j. **Target System Visual Indications.** Target system effects are indicated by the strobe lights in the retro detector unit (RDU). The following visual indications are given by the target system:

## 6-2. CONFERENCE/DEMONSTRATION/PRACTICAL EXERCISE (Con't).

Note. Show Slide 17.

- (1) **NEAR MISS = 2 strobe light indications.** If a target is exposed to a near miss, the RDUs will flash two times with the strobe light of each RDU.
- (2) **HIT = 4-6 strobe light indications.** If a target is exposed to a hit, the RDUs will flash 4-6 times with the strobe light of each RDU (360 degrees coverage).

Note. WEAPON KILL and MOBILITY KILL are also indicated with 4-6 strobe indications.

- (3) **KILL = continuous strobe light indication.** If the target is killed by a round or a CGUN, the RDUs will flash continuously. This indication will continue until the system is reactivated.

Notes.

1. If the tank is killed during panel gunnery, the target system autoactivates after 10 seconds and the kill indications stop. The tank ammunition load is returned to the pre-programmed load.
2. Show Slide 18.

- k. **Target System HIT Functions.** TWGSS can simulate three different types of tank hits. It is important the crew reacts properly to each type.

Note. During force-on-force exercises, the tank commander must take the correct action for the type of hit indicated on the control panel.

- (1) **HIT.** The tank has been hit but not damaged or killed, therefore it can continue to fight.

Note. MOBILITY KILL will only be indicated if the tracks are hit.

- (2) **HIT with MOBILITY KILL.** The tank has been damaged and immobilized. If a mobility kill is indicated, the crew must stop within 30 seconds or the tank will be killed. During a mobility kill, the crew can continue to engage targets from a stationary position.

Note. WEAPON KILL will only be indicated if the gun barrel or sights are hit.

- (3) **HIT with WEAPON KILL.** The tank has been hit by a round and the weapon system has been damaged. The tank can still maneuver but cannot fire the main gun or coax.
- (4) **KILL.** The tank has been hit and the target system evaluates the round to have killed the tank. The vehicle must be stopped (when the crew considers this action safe) and they must wait for further instructions.

## 6-2. CONFERENCE/DEMONSTRATION/PRACTICAL EXERCISE (Con't).

Note. Show Slide 19.

1. **Tamper During Combat Mode (Force-on-force) Exercises.** If TWGSS is tampered with or if something breaks down, this will be indicated as tamper to the crew. The crew has 30 seconds to correct the failure on the system. If not corrected, TWGSS will consider itself Not Mission Capable (NMC) for a force-on-force exercise. The following tamper indications are provided:
  - (1) **Sound indication.** The tank intercom informs the crew to check the control panel.
  - (2) **Tamper pop-up.** A tamper pop-up appears on the display screen to inform the crew that there is something that must be corrected.
  - (3) **Visual indication.** The retro detector units of TWGSS indicate with flashes if something is incorrect.

Note. Show Slide 20.

- m. **Tamper During Panel Gunnery Exercises.** If TWGSS is tampered with or if something breaks down, this is indicated as a BIT error to the crew. A BIT indication removes the capability to fire until corrected. The following indications are provided:
  - (1) **Sound indication.** The tank intercom informs the crew to check the control panel.
  - (2) **BIT pop-up.** A error pop-up will appear on the display screen to inform the crew that there is something wrong with the system.
  - (3) **Visual indication.** TWGSS RDUs will indicate with flashes if something is incorrect.

- Notes.
1. The primary instructor now releases the student crews to their assigned assistant (small group) instructors for the practical exercise portion of this lesson.
  2. Prior to students' arrival, ensure that an assistant instructor is assigned to each training station.
  3. Direct students to their appropriate training station.
  4. Each assistant instructor is to conduct a safety briefing for his small group IAW Appendix B.
  5. Whenever possible, have the students serve as demonstrators during small group instruction. Have one student read the procedures while another student performs the task. To ensure all students get equal hands-on time, rotate the reading and performance responsibilities.
  6. The assistant instructor discusses and clarifies the procedures as required and reinforces the training objective.
  7. Ensure training area is set up IAW Appendix D for each training mode selected.



## 6-2. CONFERENCE/DEMONSTRATION/PRACTICAL EXERCISE (Con't).

8. Ensure TDRS memory card is set up IAW Appendix C for each training mode selected.

**Warning.** The moving and operation of tank during the practical exercise portion of this lesson must be done under the instructor's supervision.

- Notes.
1. Instruct the crew on how to transfer ammunition using the upload function in the control panel when ready rack ammunition is depleted.
  2. The instructor can replenish ammunition loads with the RESET setting on the CGUN.

- n. **TWGSS Operation.** TWGSS can perform gunnery in four modes: panel gunnery; combat mode; scaled gunnery mode; and tracking training mode.

- (1) **Panel gunnery mode.** Fire on target and verify the following:

- (a) Select TWGSS as rangefinder using control panel.
- (b) Lase to target and verify that correct range appears in sights.
- (c) Lase in front of target and verify that a range of 190 m for main gun and 10 m for coax is presented in sight.
- (d) Lase over target and verify that a range of 4010 m for all ammunition types is presented in sight.
- (e) Fire SABOT from all sights and verify obscuration, ground burst, hit burst, and tracer.
- (f) Fire HEAT from all sights and verify obscuration, ground burst, hit burst, and tracer.
- (g) Fire COAX from all sights and verify ground burst, hit burst, and tracer.
- (h) Fire all ammunition types and verify results on control panel are understood.
- (i) Select graphic display. Fire all ammunition types and verify result presentation.
- (j) Verify ammunition is decreased when a round is fired.

**Warning.** Ensure LRF eye-safe laser (ELF) filter is installed prior to selecting tank LRF.

- (k) Select tank LRF function. Lase to target and verify function.
- (l) Verify TWGSS loading and firing sound indications.
- (m) Use a CGUN to fire KILL, RESET, TEST, and TIME MARK on tank and verify control panel menus, sound, and light indications.
- (n) Fire ENABLE CONTROL with CGUN. Upload ammunition manually to turret and hull.
- (o) Select display position. Verify control panel displays vehicle position as determined by the remote system interface (RSI).
- (p) Unplug left front RDU. Verify control panel tamper indication. Try to fire.

## 6-2. CONFERENCE/DEMONSTRATION/PRACTICAL EXERCISE (Con't).

- Notes.
1. Ensure that TDRS memory card is set up for combat mode IAW Appendix C.
  2. Position target tanks for combat mode IAW Appendix D.
  3. Use the CGUN to activate target tank if killed.

(2) **Combat mode.** Fire on target and verify the following:

Note. Point out to students that during combat mode TWGSS compensates for the retro reflector unit position.

- (a) Select Simulation (SI), Remaining Ammo (RM). Fire SABOT at TWGSS-equipped target vehicle. Aim at center of mass and verify that system compensates for retro reflector offset in combat mode (result is approximately 0.0 in. elevation and azimuth).
- (b) Verify target NEAR MISS, HIT and KILL visual indications.
- (c) Have target vehicle crew cover all hull defilade detector units (HDDUs) exposed to firing tank. Fire into hull and verify that vehicle is not killed.

Caution. **Do NOT use force when connecting or disconnecting cables.**

Note. During tamper demonstration, disconnect RDU for less than 30 seconds and then longer than 30 seconds to demonstrate tamper kill.

- (d) Disconnect left-front RDU. Verify control panel indications.
- (e) Verify that it is impossible to fire when no rounds remain.
- (f) Upload ammunition using Remaining Ammo menu. Select SABOT and move ammo from hull to turret. When completed, verify that SABOT can be fired.
- (g) Have the another vehicle fire at you to verify NEAR MISS, HIT, and KILL indications on control panel, tank intercom, and strobe lights.
- (h) Position tank so the tracks can be hit. Have firing vehicle fire at track and check for MOBILITY KILL in target tank.

- Notes.
1. Ensure that TDRS memory card is set up for scaled gunnery mode IAW Appendix C.
  2. Position target tanks for scaled gunnery mode IAW Appendix D.
  3. Use the CGUN to upload ammunition.
  4. Select TWGSS LRF with control panel prior to start of exercise.

(3) **Scaled gunnery mode.** A target placed at 500 m will simulate 1000 m when 1/2 scale is selected. Select 1/2 scale application. Fire and verify the following:

## 6-2. CONFERENCE/DEMONSTRATION/PRACTICAL EXERCISE (Con't).

Note. Point out to students that the panel target placed at 500 m must be 1/2 the size of the target it represents, otherwise it will not represent the correct target size for 1000 m.

- (a) Verify that all targets are twice the distance from actual range.
- (b) Verify scaled procedures replicate actual vehicle procedure.

(4) **Tracking training mode.** Tracking training exercises can be performed in panel gunnery mode against targets with retro reflectors installed in center of mass, or in combat mode against targets with turret-installed retro reflector units.

**Warning. Ensure that LRF eye-safe laser filter (ELF) is installed during all TWGSS training.**

- (a) Tracking training mode requires that the vehicle be set up differently than normal gunnery. During tracking training, TWGSS measures the gunner's aim in relation to the target. When the trigger is pressed, the gunner's tracking result is stored on the TDRS memory card for After Action Review (AAR). To correctly measure the gunner's aim point, the vehicle must be set up as follows.
  - 1. Input the following computer correction factors using the gunner's computer control panel (CCP) .

| <u>Ammunition</u> | <u>Subdesignation</u> | <u>Azimuth</u> | <u>Elevation</u> |
|-------------------|-----------------------|----------------|------------------|
| SABOT             | 59 (MILES)            | 0.0            | 0.0              |
| HEAT              | 59 (MILES)            | 0.0            | 0.0              |
| COAX              | 59 (MILES)            | 0.0            | 0.0              |

- 2. Input the following ballistic data using the gunner's CCP.

Note. Leave cant and range buttons in normal position.

- a. Cancel lead automatic input (leave button lit when CCP is switched OFF).
    - b. Set cross wind sensor value to 0 mph and cancel out automatic input.
    - c. Set ammunition temperature to 69.8° F.
    - d. Set air temperature to 59° F.
    - e. Set barometric pressure to 29.92 in. of mercury.
    - f. Set coax boresight values the same as boresight values for main gun.
    - g. Set coax zero to elevation 0.0 and azimuth 0.0.
    - h. Set gun tube wear to 0.0 (M1 only).

## **6-2. CONFERENCE/DEMONSTRATION/PRACTICAL EXERCISE (Con't).**

- (b) Perform normal alignment procedures, but do not perform TBOS alignment for GAS or GPS gunner/commander. The TBOS effects will be turned OFF during tracking training mode.

- 1. Select SIMULATION, LASER RANGEFINDER menu on control panel and select TANK LRF.

### Notes.

- 1. Prior to start of the training exercise, ensure that the TDRS memory card has been properly set up for tracking training IAW Appendix C.
- 2. Prior to the start of the training exercise, prepare a HMMWV with retro reflector units installed on center of mass. Instruct driver to drive a parallel path approximately 600 m away.

- (c) Operation of tracking training mode.

- 1. Load a round and select main or coax.
  - 2. Arm the weapon.
  - 3. When gunner's or commander's palm switch is pressed, tracking data collection is started.

### Note.

Inform students that trigger activation will provide the tracking result which is stored on the TDRS memory card for AAR.

- 4. Tracking data is collected until one of the following events occurs:
    - a. The gun trigger is activated for firing main gun or coax.

### Note.

Inform students that if the tracking time elapses, no tracking values will be stored on the TDRS memory card for AAR.

- b. The tracking time has elapsed. (Time is selected prior to exercise by instructor).

### Note.

Inform students that if the palm switch is released, no tracking values will be stored on the TDRS memory card for AAR.

- c. Gunner's or commander's palm switch is released.

- 5. Set the SAFE/ARM switch to SAFE.

### Note.

Demonstrate AAR of tracking training to the students on the TDRS computer unit.

- 6. Repeat tracking training exercise by starting at step (c) 1.

**6-2. CONFERENCE/DEMONSTRATION/PRACTICAL EXERCISE (Con't).**

- Notes.
1. Have students practice tracking training against a moving target.
  2. Evaluate tracking training exercise using the TDRS computer unit.

**6-3. FINAL REVIEW. (5 minutes)**

a. **Student Questions.**

Note. Show Slide 21.

b. **Summary of Main Teaching Points.**

- (1) Panel gunnery
- (2) Combat gunnery (force-on-force)
- (3) 1/2 scale gunnery
- (4) Tracking training

Note. Show Slide 22.

- c. **Closing Statement.** To get the maximum training value from the TWGSS equipment, you must be able to correctly operate the system in the various training modes.

## **APPENDIX A TO LESSON PLAN 6**

### **OPERATION OF TWGSS**

#### **TOOLS, EQUIPMENT, AND MATERIALS**

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Listed equipment is one per tank crew, except as noted.

1. M1/M1A1 tank with TWGSS installed
2. TM 9-6920-709-12&P-1-1
3. T80 frontal target with target lifter placed at 1500 m
4. T80 frontal target with target lifter placed at 800 m
5. Infantry (coax) target placed at 300 m
6. Retro reflector unit (one for each target used)
7. LTID (one for each target used, if available)
8. TDRS memory card, programmed IAW Appendix C
9. TDRS computer unit (one per class)
10. Training area with a minimum of 1500 m of maneuver space
11. HMMWV with retro reflector unit installed on left and right side center of mass

## **APPENDIX B TO LESSON PLAN 6**

### **OPERATION OF TWGSS**

#### **SAFETY**

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Listed general safety regulations are to be strictly enforced during the performance of this lesson.

1. Mount and dismount tank over left front fender.
2. Maintain three points of contact while on top of tank.
3. No smoking within 50 m of tank.
4. Do not go over or under gun tube.
5. Ensure LRF has eye-safe laser filter (ELF) installed and LRF is set to SAFE.
6. LASER SAFETY: Do not view transceiver unit with optics from a distance of 25 m or closer.
7. Ensure proper hearing protection is worn when using pyrotechnics.
8. When using pyrotechnics (Hoffman device), ensure area is clear 50 m to the front and 25 m to the sides.
9. Ensure gun/turret drive (GTD) switch is set to MANUAL position during installation/removal, alignment, troubleshooting, and before leaving turret.

## APPENDIX C TO LESSON PLAN 6

### OPERATION OF TWGSS

#### TDRS MEMORY CARD SETUPS

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The TDRS memory card used for the practical exercise portion of this lesson is set up with the following basic data. Each tank crew is provided a card prior to the lesson.

##### **C-1. SETUP FOR PANEL GUNNERY.**

|                             |                           |                           |
|-----------------------------|---------------------------|---------------------------|
| Application:                | M1/M1IP                   | M1A1                      |
| Exercise Area:              | Select exercise area used | Select exercise area used |
| New Ammo:                   | Yes                       | Yes                       |
| First Insert Only:          | No                        | No                        |
| <u>Main Weapon:</u>         |                           |                           |
| SABOT Turret:               | 16 rounds                 | 11 rounds                 |
| HEAT Turret:                | 9 rounds                  | 6 rounds                  |
| SABOT Hull:                 | 18 rounds                 | 15 rounds                 |
| HEAT Hull:                  | 12 rounds                 | 8 rounds                  |
| Load Time:                  | 6 seconds                 | 6 seconds                 |
| Upload Time:                | 60 seconds                | 60 seconds                |
| <u>COAX Rounds:</u>         |                           |                           |
| 7.62 Turret:                | 11400 rounds              | 11400 rounds              |
| 7.62 Hull:                  | 0 rounds                  | 0 rounds                  |
| Upload Time:                | - seconds                 | - seconds                 |
| Exercise Type:              | Panel gunnery             | Panel gunnery             |
| <u>Tracer:</u>              |                           |                           |
| Tracer On:                  | Yes                       | Yes                       |
| Burst On:                   | Yes                       | Yes                       |
| Obscuration:                | 1 second                  | 1 second                  |
| <u>Presentation:</u>        |                           |                           |
| Audio:                      | Yes                       | Yes                       |
| Control Panel Presentation: | Yes                       | Yes                       |
| Firing:                     | Full scale                | Full scale                |
| Dispersion:                 | No                        | No                        |
| User Data:                  | Input crew data           | Input crew data           |



## C-2.      **SETUP FOR COMBAT MODE (FORCE-ON-FORCE).**

|                             |                           |                           |
|-----------------------------|---------------------------|---------------------------|
| Application:                | M1/M1IP                   | M1A1                      |
| Exercise Area:              | Select exercise area used | Select exercise area used |
| New Ammo:                   | Yes                       | Yes                       |
| First Insert Only:          | No                        | No                        |
| <u>Main Weapon:</u>         |                           |                           |
| SABOT Turret:               | 16 rounds                 | 11 rounds                 |
| HEAT Turret:                | 9 rounds                  | 6 rounds                  |
| SABOT Hull:                 | 18 rounds                 | 15 rounds                 |
| HEAT Hull:                  | 12 rounds                 | 8 rounds                  |
| Load Time:                  | 6 seconds                 | 6 seconds                 |
| Upload Time:                | 60 seconds                | 60 seconds                |
| <u>COAX Rounds:</u>         |                           |                           |
| 7.62 Turret:                | 400 rounds                | 400 rounds                |
| 7.62 Hull:                  | 0 rounds                  | 0 rounds                  |
| Upload Time:                | - seconds                 | - seconds                 |
| Exercise Type:              | Combat mode               | Combat mode               |
| <u>Tracer:</u>              |                           |                           |
| Tracer On:                  | Yes                       | Yes                       |
| Burst On:                   | Yes                       | Yes                       |
| Obscuration:                | 1 second                  | 1 second                  |
| <u>Presentation:</u>        |                           |                           |
| Audio:                      | Yes                       | Yes                       |
| Control Panel Presentation: | No                        | No                        |
| Firing:                     | Full scale                | Full scale                |
| Dispersion:                 | Yes                       | Yes                       |
| User Data:                  | Input crew data           | Input crew data           |

### C-3.      **SETUP FOR SCALED GUNNERY.**

|                             |                           |                           |
|-----------------------------|---------------------------|---------------------------|
| Application:                | M1/M1IP                   | M1A1                      |
| Exercise Area:              | Select exercise area used | Select exercise area used |
| New Ammo:                   | Yes                       | Yes                       |
| First Insert Only:          | No                        | No                        |
| <u>Main Weapon:</u>         |                           |                           |
| SABOT Turret:               | 16 rounds                 | 11 rounds                 |
| HEAT Turret:                | 9 rounds                  | 6 rounds                  |
| SABOT Hull:                 | 18 rounds                 | 15 rounds                 |
| HEAT Hull:                  | 12 rounds                 | 8 rounds                  |
| Load Time:                  | 6 seconds                 | 6 seconds                 |
| Upload Time:                | 60 seconds                | 60 seconds                |
| <u>COAX Rounds:</u>         |                           |                           |
| 7.62 Turret:                | 11400 rounds              | 11400 rounds              |
| 7.62 Hull:                  | 0 rounds                  | 0 rounds                  |
| Upload Time:                | 60 seconds                | 60 seconds                |
| Exercise Type:              | Scaled gunnery            | Scaled gunnery            |
| <u>Tracer:</u>              |                           |                           |
| Tracer On:                  | Yes                       | Yes                       |
| Burst On:                   | Yes                       | Yes                       |
| Obscuration:                | 1 second                  | 1 second                  |
| <u>Presentation:</u>        |                           |                           |
| Audio:                      | Yes                       | Yes                       |
| Control Panel Presentation: | Yes                       | Yes                       |
| Firing:                     | Scaled gunnery            | Scaled gunnery            |
| Dispersion:                 | No                        | No                        |
| User Data:                  | Input crew data           | Input crew data           |

#### C-4.      **SETUP FOR TRACKING TRAINING.**

|                             |                           |                           |
|-----------------------------|---------------------------|---------------------------|
| Application:                | M1/M1IP                   | M1A1                      |
| Exercise Area:              | Select exercise area used | Select exercise area used |
| New Ammo:                   | Yes                       | Yes                       |
| First Insert Only:          | Yes                       | Yes                       |
| <u>Main Weapon:</u>         |                           |                           |
| SABOT Turret:               | 16 rounds                 | 11 rounds                 |
| HEAT Turret:                | 9 rounds                  | 6 rounds                  |
| SABOT Hull:                 | 18 rounds                 | 15 rounds                 |
| HEAT Hull:                  | 12 rounds                 | 8 rounds                  |
| Load Time:                  | 5 seconds                 | 5 seconds                 |
| Upload Time:                | 60 seconds                | 60 seconds                |
| <u>COAX Rounds:</u>         |                           |                           |
| 7.62 Turret:                | 400 rounds                | 400 rounds                |
| 7.62 Hull:                  | 0 rounds                  | 0 rounds                  |
| Upload Time:                | - seconds                 | - seconds                 |
| Exercise Type:              | Panel gunnery             | Panel gunnery             |
| <u>Tracer:</u>              |                           |                           |
| Tracer On:                  | No                        | No                        |
| Burst On:                   | No                        | No                        |
| Obscuration:                | 0 seconds                 | 0 seconds                 |
| <u>Presentation:</u>        |                           |                           |
| Audio:                      | No                        | No                        |
| Control Panel Presentation: | No                        | No                        |
| Firing:                     | Tracking                  | Tracking                  |
| Tracking Time:              | 10 seconds/1.0 mil        | 10 seconds/1.0 mil        |
| Dispersion:                 | No                        | No                        |
| User Data:                  | Input crew data           | Input crew data           |
| Event:                      | Tracking training         | Tracking training         |

**APPENDIX D  
TO LESSON PLAN 6**

**OPERATION OF TWGSS**

**SETUP OF TRAINING AREA**

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**D-1. PANEL GUNNERY.**

This target emplacement can be used for full range panel gunnery and scaled gunnery.

**D-2. COMBAT MODE (FORCE-ON-FORCE).**

**APPENDIX E  
TO LESSON PLAN 6  
OPERATION OF TWGSS  
VIEWGRAPHS**

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